



Room Temperature Epitaxial Growth of Complex Oxide Interfaces with High Mobility Two-Dimensional Electron Gases

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Room Temperature Epitaxial Growth of Complex Oxide Interfaces with High Mobility Two-Dimensional Electron Gases

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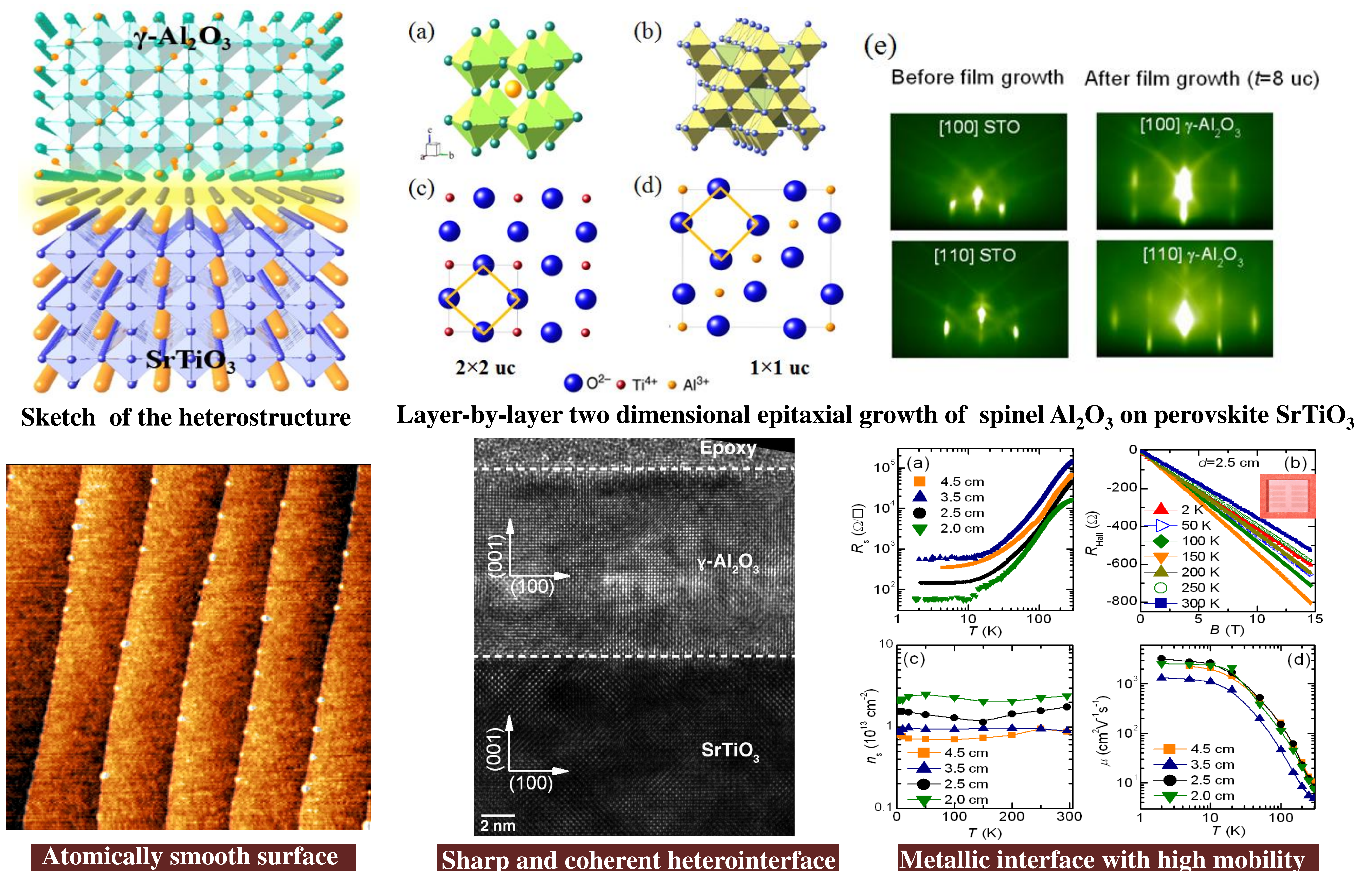
Creating high mobility oxide 2DEGs at room temperature

Motivation:

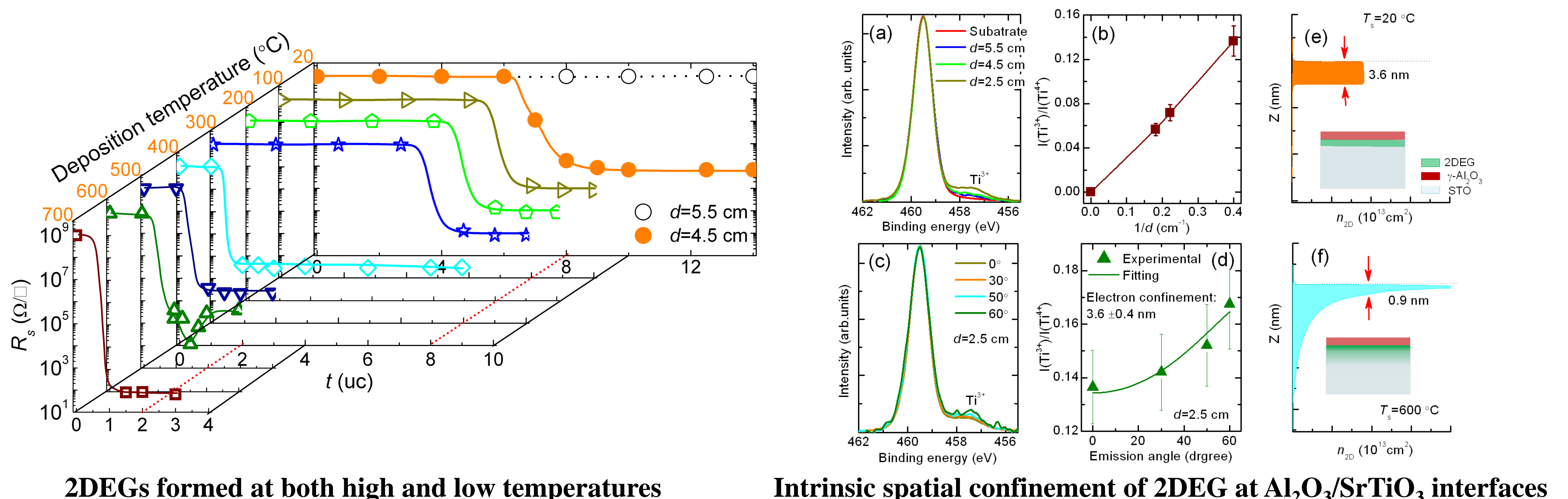
Two dimensional electron gases (2DEGs) formed at the interface between two insulating oxides provide new opportunities for electronics. However, it remains rather challenging to fabricate nano-patterned oxide 2DEGs without compromise in the high mobility. The room temperature created oxide 2DEG can make a difference since it can:

- ❖ Suppress both the cation intermixing and the oxygen bulk diffusion across the interface;
- ❖ Compatible with the established lithography of semiconductor microfabrication for making patterned structures.

Room temperature epitaxial growth of alumina on strontium titanate



Spatial confinement of 2DEGs at epitaxial $\text{Al}_2\text{O}_3/\text{SrTiO}_3$ interfaces



Reference

- 1) Y. Z. Chen *et al.* *Adv. Mater.* **26**, 1462 (2014); 2) Y. Z. Chen *et al.*, *Nat. Commun.* **4**:1371 doi: 10.1038/ncomms2394 (2013).